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Public Health 
Seattle & King County

DATE: September 14, 2008

TO: Saroja Reddy, KC Council Policy Staff Director, IB Co-chair
Elissa Benson, designee for Bob Cowan, Director KC OMB, IB Co-chair
KC Animal Services Inter-branch (IB) Work Group members

FR: Sharon G. Hopkins, DVM, MPH
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RE: Review of euthanasia records at KCACC, Kent Shelter

Purpose: As the veterinarian representing Public Health—Seattle & King County on the King County Animal Services Inter-Branch Work Group, I was asked by the Work Group to investigate concerns expressed by Dr. Brad Crauer and others about the accuracy of euthanasia logs maintained at the Kent shelter and euthanasia statistics reported by King County Animal Services. Concerns that the number of animals euthanized by King County Animal Care and Control (KCACC) are significantly underreported have been expressed on a number of occasions and were brought up at the Inter-Branch Stakeholder's meeting held on the evening of August 28, 2008. Specifically, Dr Crauer, a community veterinarian volunteering at the KCACC Kent shelter, said he had reviewed controlled drug logs at the shelter and had found routine and large discrepancies in the log with excessive volumes of euthanasia solution frequently used for individual animals, potentially suggesting a larger number of animals are euthanized than are reported by KC Animal Services.

Summary: On 9/2/08 and 9/4/08, I reviewed records kept at the KCACC shelter in Kent relating to use of euthanasia solution (Fatal Plus). Time spent on record review, not including analysis or preparation of this report, was approximately 11 hours. In the sample of records from 2008 that I examined and in other reviews described below, I did not find examples of unusual volumes of euthanasia solution used or significant discrepancies between the controlled drug euthanasia logs and the data contained in the shelter's Chameleon database system used to generate statistical reports with the exception of two entries in Chameleon that appeared to be data entry errors (see Procedure 1 below for details). Furthermore, I did not find evidence that additional animals had been euthanized in 2008 beyond the reported numbers released by KCACC.

The following documents the approach that I took, the results, recommendations based on my findings, and conclusions.

Background

Fatal Plus is the commercial product used by authorized KCACC staff for euthanizing animals. It is packaged as a powder in multi-dose screw top clear plastic bottles which are reconstituted to a volume of 250 cc prior to use. The

reconstituted solution is blue in color and contains 390 mg/cc of pentobarbital sodium. This is the standard drug for humane euthanasia recommended in the Washington State Board of Pharmacy's Model Policies and Procedures for Administration and Recordkeeping of Legend Drugs used by Animal Control Agencies and Humane Societies. The dosage (volume) given is based on the size of the animal and injection route. It is usually injected intravenously with a needle and syringe but may also be injected into the abdominal cavity or into the heart. Typical dosages used at KCACC range from 2 cc for a small cat to 15 cc for a large dog. There are pre-printed markings in 10 cc increments on the side of the bottle that allows a visual estimate of the volume of solution remaining in a bottle. A federal Drug Enforcement Administration (DEA) license is required to purchase Fatal Plus, given that pentobarbital is a Schedule II controlled substance.

I determined that Fatal Plus bottles are kept in three places within the Shelter: 1) in a locked cabinet in the administrative office used by the Shelter Sergeant and several other senior staff; 2) in locked metal boxes (termed Euthanasia Kits) kept in a locked cabinet in the designated Euthanasia Room located in the shelter off the truck unloading bay; 3) in a locked cabinet in the Veterinary Clinic. There are a total of 8 Euthanasia Kits (numbered 1-8) under the supervision of the Shelter Sergeant and one kit (not assigned a number) under supervision of the Veterinarian. A controlled substance log book is kept with each Fatal Plus bottle in use; individual log books are assigned to specific staff members, except for Kit #2 which is shared by two staff members, and the kit at the Veterinary Clinic which is used by authorized veterinary personnel. Log books are labeled with the staff person's name and number, and they are locked up when not in use. Most log books contained records going back several years, although some appeared to have been assigned to more recently-hired staff.

Six current shelter staff and additional veterinary personnel have been trained and are authorized to administer euthanasia. Each person administering euthanasia is responsible for keeping detailed records documenting the use of Fatal Plus, as required by the Washington State Board of Pharmacy. Data maintained in the log books for each dose of Fatal Plus administered include: Bottle number, euthanasia date, animal ID number, animal description, species, reason for euthanasia, volume administered, and a running tally of the volume remaining in bottle (calculated by subtracting each dose given from the starting volume). Entries are hand written in ink and each entry is initialed by the person administering the dose. When a bottle has been used up, an entry is made that the bottle was empty and the number for the next bottle in use is entered into the log. Only one bottle of Fatal Plus per kit is in use at any time. New bottles are obtained from the Shelter Sergeant and the assigned bottle number logged into the Bottle Inventory log.

KCACC purchases Fatal Plus in 100 bottle lots and consecutively numbers each bottle with a black marker. Inventory of unused bottles are kept in a locked cabinet in the administrative office used by the Shelter Sergeant and several other supervisory level personnel. The same cabinet contains the Euthanasia Kit assigned to the Shelter Sergeant and a bottle (#42) of unreconstituted Fatal Plus (used on rare occasions for oral administration to animals to produce sedation), the log book for that kit, and a log book that lists each bottle of Fatal Plus by its

assigned number, the initials of the staff person issued the bottle and the date. These records are maintained by the Shelter Sergeant.

Data Inspection Procedures

Five methods were undertaken designed to check the accuracy of entries in the controlled substance euthanasia logs, the volume of euthanasia solution being used, and the comparability of paper records (euthanasia logs) with computerized records (Chameleon database). In addition, several euthanasia reports e-mailed to me in June, July and August were compared to the same reports generated from the Chameleon database on September 2nd to see if database changes had been made in the interim.

Procedure 1: Comparison of a sample of Chameleon (shelter database) records with entries in the corresponding Euthanasia Logs (started on 9/2, completed 9/4/08)

On the morning of 9/2/08, I appeared at the Kent shelter and requested that the Euthanasia Reports from the Chameleon database be printed for a series of dates. I had informed a KCACC supervisor that I would be at the shelter that morning, but I did not specify what records and other materials I would be inspecting. The dates chosen for review were not provided to KCACC staff in advance but rather were determined by me at the time of the request. These were provided to me from the printer within a few minutes of my request. The records were 3 dates in each month Jan through June and 4 dates in July, for a total of 22 days. They represented all 7 days of the week.

I compared the number of animals euthanized each day per the Chameleon record to the number of animals euthanized per the Euthanasia Log record. I further compared the following data elements: Animal ID number, Animal Species, and dosage of Fatal Plus administered. I also examined the 'reasonableness' of the dose administered compared to the type (size) of animal being euthanized.

Results:

Chameleon records showed 120 animals euthanized on the 22 dates selected for evaluation. Of these, 118 were euthanized at KCACC Kent shelter and 2 were euthanized at Five Corners Veterinary Hospital. By species, there were 61 cats, 57 dogs, 1 rabbit, and 1 opossum euthanized. The number of euthanasias performed per day ranged from zero (5/1/08) to 17 (7/11/08), for an average of 5.45/day.

The volume of the euthanasia solution administered to each of the 118 animals euthanized was consistent with the type and breed of the animal. The volumes administered to cats ranged from 1 cc to 8 cc. When the volume administered to a cat was at the high end of the range (5-8cc), it was generally for a cat described as feral. This is consistent with the intraperitoneal (into the abdominal cavity) injection usually used in feral cats compared to the intravenous injection into a vein on the front of the foreleg used for more tractable pet-type cats or medically debilitated cats. This is because an effective and humane intraperitoneal injection

requires a higher dosage (volume) of drug compared to intravenous administration. The volumes administered to dogs were consistent with the likely size of the dog based on its breed; doses ranged from 3 cc (Pomeranian mix) to 16 cc (pit bull).

When I cross-referenced Chameleon records for the 118 shelter euthanasias performed on the 22 dates with the Euthanasia Logs, one record (0.8%) in Chameleon was not found in the logs.

Cross-referencing also found one record with a discrepancy in the date of euthanasia. In this case, the Euthanasia Log recorded the date as 5/10/08 and Chameleon as 5/11/08 but this was clearly the same animal since it was indicated as an opossum in both data sources and relatively few opossums are euthanized at KCACC. There were no euthanasias found in the Euthanasia Logs for the selected dates that were not in the Chameleon records.

There were two discrepancies found in the ID numbers recorded in Chameleon vs. the number in the log. These appeared to be data recording or data entry errors because the information otherwise matched (e.g., the species, animal description, and volume of euthanasia solution administered); in one case the discrepancy was in one numeral of the 5 number code (#23313 in Chameleon vs. #23353 in the log) and the other was a two numeral difference in the codes.

Cross-referencing the 118 euthanasias revealed 9 mismatches in the volume of Fatal Plus administered to an animal. These appeared to be data entry problems, the major error being where 400 cc was recorded in Chameleon when 4 cc were indicated in the Euthanasia Log (4 cc was consistent with the type of animal euthanized). These discrepancies are tabulated below:

Date	Chameleon record	Euthanasia log
1/2/08	4 cc	5 cc
	3 cc	2 cc
	4 cc	3 cc
1/12/08	12 cc	5 cc
1/22/08	8 cc	10 cc
3/12/08	10cc	8 cc
6/11/08	10 cc	8 cc
7/1/08	400 cc	4 cc
	0 cc	8 cc

Findings: This evaluation of a sample of euthanasia records showed a very high level of correlation between the two data sources (log book and Chameleon) in the number of euthanasia procedures performed (<1% difference). In all cases the volume of euthanasia solution administered to each animal, as recorded in the controlled substance euthanasia logs, was consistent with the type of animal being euthanized. Further comparison of individual data elements revealed some discrepancies that, in my opinion, are within the expected levels for records of this type.

Recommendations: 1) Range checks could be established in Chameleon that would flag, at the time of data entry, apparently erroneous data such as 0 cc or 400 cc

administered for euthanasia, as seen in the entries for 7/1/08 in the table above.
 2) On July 30, 2008, the Washington Board of Pharmacy issued a memorandum and interim guidelines for humane societies and animal control agencies on administration and recordkeeping for legend drugs including sodium pentobarbital. KCACC should review these new guidelines to assure procedures and recordkeeping are in compliance.

Procedure 2: Comparison of current Fatal Plus bottle volumes with volumes indicated per Euthanasia logs (conducted 9/2/08)

At my request, each of the 8 Euthanasia Kits was unlocked by the Shelter Sergeant and I recorded the volume in the Fatal Plus bottle by visual inspection. After recording this, I opened the Euthanasia log associated with each kit and recorded the remaining balance per the log's last entry. *Note: Some kits had relatively little use and contained a bottle issued before 1/2008; therefore some bottle numbers in the Table below may appear out of sequence compared to the bottles issued in 2008 and described in Procedure 3.*

Kit #	Fatal Plus Bottle #	Volume of Fatal Plus by visual exam of bottle (cc's)	Volume of Fatal Plus remaining as stated in the Euthanasia log (cc's)	Discrepancy
1	71	170	170	0
2	73	91	91	0
3	65	208	203	-5
4	95	93	70	-23*
5	52	131	128	-4
6	67	208	200	-8
7	22	180	185	+5
8	68	205	211	+6

*The log record had a notation that due to damage of Kit #3, Fatal Plus solution from that kit had been transferred to Kit #4. This may account for the excess volume observed in Bottle #95.

Finding: Seven of the 8 kits showed a good level of correlation between the volume of euthanasia solution observed by visual inspection and the volume recorded in the associated euthanasia log book. For Kit #4, the discrepancy had a plausible explanation based on comments included with entries into the log in early March, 2008.

Procedure 3: Accounting for bottles of Fatal Plus used in 2008 (conducted 9/4/08)

To account for bottles of Fatal Plus used in 2008, I examined the Bottle Inventory log (a master list of bottles that have been given out for use), accounted for unused bottles, and cross-referenced the Bottle Inventory log of assigned bottles with the bottles in the individual Euthanasia Kit logs.

Results: There were 3 bottles of Fatal Plus remaining from the 2007 order (#3, #2, #1) that were assigned in 2008. Per the Bottle Inventory log, these bottles were issued to staff on 1/12/08, 1/18/08 and 1/23/08, respectively. Bottle #100 from the lot purchased in 2008 was issued on 2/2/08 and 65 bottles had been assigned and gone into use as of 9/4/08. Each bottle counting down from #100 to #65 was appropriately accounted for in the Euthanasia Kit logs contained in the Euthanasia Room with the exception of bottles that had been assigned to Veterinary Clinic personnel. The Veterinary Clinic Euthanasia log did not note bottle numbers, although the log did record date, animal ID number, animal description, species, reason for euthanasia, volume of Fatal Plus administered, and the initials of the person administering the dose. Each unused bottle from the 2008 purchase, consecutively numbered from Bottle #64 down to Bottle #1, was present in the locked cabinet.

Findings: Euthanasia solution storage and tracking log books were organized and well-maintained, and there appeared to be care taken to keep both the Fatal Plus bottles and the log books secured when not in use. The notable exception was the log maintained in the Veterinary Clinic, which did not include the number of the bottle in use and did not maintain a running balance of euthanasia solution remaining in bottles; this appeared to be due to the lack of awareness on how information was recorded in the Euthanasia logs maintained by other shelter staff.

With the exception of two bottles of Fatal Plus (#1 and #78) assigned to the Veterinary Clinic on 1/23/08 and 6/9/08, respectively, all 68 bottles of Fatal Plus assigned in 2008 were clearly accounted for in the Euthanasia log of the person to whom the bottle was assigned.

Follow-up: I talked to the lead veterinarian and veterinary technician and advised that bottle numbers should be recorded when a new bottle put into use, and that a running tally should be kept of the volume of solution used from each bottle. I showed them a log book from the Euthanasia Room as an example. With Lori present, I labeled the headings in the Vet Clinic log book to maintain this information and noted the current bottle in use (#69). [A check later in the day showed that the new system was in use.]

Procedure 4: Accuracy of usage recorded for randomly-selected Fatal Plus bottles (conducted 9/4/08)
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I assembled the logs for the Euthanasia Kits and randomly selected records for bottles recorded in the logs. I tallied up the individual entries of volumes used as indicated by the log for that bottle. The results of this tally should closely match the initial volume in the bottle (250 cc) or the ending volume in the case of Kits #4 and #5 where the selected bottle was not empty.

Results were as follows:

Kit #	Bottle #	Dates used	Starting volume	Tally of doses per log	Ending volume per log	Discrepancy
1	23	10/12/07 - 4/19/08	250 cc	245 cc	0	-5
2	91	2/9/07 - 2/16/07	250 cc	250 cc	0	0
3	66	8/22/08 - 8/30/08	250 cc	250	0	0
4	95	3/3/08 - 5/28/08	250 cc*	Undet*	70*	Undet*
5	52	7/15/07 - 8/5/08	250 cc	122	128	+6
6	80	6/1/08 - 7/13/08	250 cc	249	0	-1
7	Not done	-	-	-	-	-
8	98	2/8/8 - 3/9/08	250 cc	245	5	0

*This employee appeared to have made arithmetical errors that she had attempted to correct. A series of entries were crossed out in red ink and there was a notation that she was obtaining help from her supervisor on fixing the error. Because of this, it was not possible to tally the usage from this bottle. There was another problem with this employee's log as described in the table in Procedure 1 above.

Findings: The degree of discrepancies observed are within a range that I would expect given that some inaccuracies would occur in reading the markings on syringes used to administer Fatal Plus and the potential to add somewhat more or less than 250 cc of water when reconstituting a new bottle. The log associated with Kit #4 had errors that were being followed up by the employee's supervisor.

Follow-up: I pointed out the problems seen in the Euthanasia Log for Kit #4 to the Shelter Sergeant. He stated he was aware of the errors and was providing additional training and oversight and was helping the employee reconcile the records.

Procedure 5: Comparison of Chameleon euthanasia reports printed on 9/2/08 with the same report e-mailed in earlier months

A search of my saved e-mail archives yielded Animal Control Weekly Reports (responsive to Motion 12737) that are e-mailed to the KC Council and the County Executive by James Buck, Director of Executive Services. These reports were also copied to other interested individuals in several departments and offices, including me. While I had not received these reports earlier in the year (because I was not involved in the Inter-branch group until late May), I had some reports that were e-mailed to me in June and July, including reports for 3 of the dates chosen for review in Procedure 1. Through this comparison, I could verify the following:

- The Euthanasia Report for 6/11/08 that I received by e-mail on 6/24/08 was an exact match to the Euthanasia Report for the same date printed from Chameleon on 9/2/08.

- The Euthanasia Report for 6/21/08 that I received by e-mail on 7/3/08 was an exact match to the Euthanasia Report for the same date printed from Chameleon on 9/2/08.
- The Euthanasia Report for 7/31/08 that I received by e-mail on 8/22/08 was an exact match to the Euthanasia Report for the same date printed from Chameleon on 9/2/08.

CONCLUSIONS

Based on the results of the investigative procedures described in this report and performed on a sample of euthanasia records, primarily from 2008, it is my opinion that the volumes of euthanasia solution being administered to animals are consistent and reasonable and that reports generated from KCACC's shelter database system contain an accurate representation of the number of euthanasia procedures performed at KCACC in the first 7 months of this year. It should be noted that my investigation was limited in scope and does not represent a formal audit, which is scheduled to be performed by the King County Auditor's office at a later time. In addition, I concentrated primarily on records of euthanasia performed this year and can offer no opinion on earlier years.

Respectfully submitted 9/14/2008

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